

CLAIMS

What is claimed is:

- 1 1. A system for the implementation of integrating physical devices into a software based
2 framework for distributed processing, said system comprising:
3 at least one physical device;
4 an adaptation layer, comprising an adaptation layer interface and said at least one device
5 object, said device object comprising at least one capability object and one physical device
6 interface object; said physical device interface object corresponding to and controlling
7 electrical interfaces to said physical device;
8 at least one software component interface communicating with said adaptation layer
9 interface;
10 at least one software component, coupled to said software component interface; and
11 wherein said adaptation layer controls said physical device through said software
12 component interface.
13
- 1 2. The system according to claim 1 wherein said physical device is at least one physical
2 device chosen from the group of physical devices consisting of programmable devices,
3 general purpose processors, specialized circuits, and field programmable gate arrays.
4
- 1 3. The system according to claim 1 wherein said at least one software component interface
2 is common to said software-based frameworks for distributed computing.
3
- 1 4. The system according to claim 1 wherein said at least one software component interface
2 comprises at least six service interfaces.
3
- 1 5. The system according to claim 1 wherein said at least one software component interface
2 comprises:
3 a communication service interface; and
4 a control service interface;

1 6. The system according to claim 1 wherein said at least one software component interface
2 comprises:
3 a deployment service interface;
4 a communication service interface;
5 a communication connection service interface;
6 an engineering service interface;
7 a control service interface; and
8 a component behavior control interface.

9
1 7. The system according to claim 1 further comprising an adaptation layer interface, said
2 adaptation layer interface providing a single point of interface between said adaptation
3 layer and said at least one software component interface.

4
1 8. The system according to claim 1 wherein said at least one physical device is interfaced
2 to a general purpose processor.

3
1 9. The system according to claim 1 further comprising a processor core deployed on at
2 least one said physical device.

3
1 10. The system according to claim 1 wherein said physical device interface object controls
2 said physical device independently from a functionality performed by said physical device

3
1 11. The system according to claim 1 wherein said capability object controls a functionality
2 performed by said physical device independently from said physical device.

3
1 12. The system according to claim 1 wherein said physical device is replaceable.

2
1 13. The system according to claim 11 wherein said physical device interface object is
2 replaceable.

3
1 14. The system according to claim 1 wherein said capability object is replaceable.

1 15. The system according to claim 1 wherein said capability object provides activities for
2 compliance with a software network, said activities comprising:
3 deployment;
4 control;
5 behavior control;
6 establishment of connections for communications;
7 communication and data transfer; and
8 data sampling and output.
9

1 16. The system according to claim 1 wherein said capability object comprises:
2 at least one base instance object;
3 at least one communication object, having a communication instance object; and
4 at least one engineering object, having an engineering instance object.
5

1 17. The system according to claim 16 wherein said base instance object, said
2 communication instance object, and said engineering instance object are replaceable.
3

1 18. A system for the control of a software component operating on a software based
2 framework, said system comprising:
3 a capability object deployed on a device object corresponding to a physical device;
4 said capability object comprising:
5 at least one base instance object;
6 at least one communication object; and
7 at least one engineering object.
8

1 19. The system according to claim 18 wherein said physical device is at least one physical
2 device chosen from the group of physical devices consisting of programmable devices,
3 general purpose processors, specialized circuits, and field programmable gate arrays.
4

1 20. The system according to claim 18 wherein said base instance is configured to provide
2 deployment, control, and behavior control activities.

1 21. The system according to claim 18 wherein said communications object is configured to
2 provide establishment of connections for communications and communication and transfer
3 of data activities.

1 22. The system according to claim 18 wherein said engineering object is configured to
2 sample data at a test point and transfer to an application for display and analysis.

1 23. The system according to claim 18 wherein said communication object comprises a
2 communication instance object, said communication instance object is configured to
3 provide deployment, control, and behavior control activities.

1 24. The system according to claim 18 wherein said engineering object comprises an
2 engineering instance object, said engineering instance object is configured to provide
3 deployment, control, and behavior control activities.

1 25. The system according to claim 18 further comprising a communication instance object,
2 a engineering instance object; said communication instance object, said engineering
3 instance object, and said base instance object each being independently replaceable.

1 26. A system for distributed processing, said system comprising:
2 a distributed processing framework;
3 a plurality of processors interfaced with said framework;
4 a client application software communicating with said framework;
5 at least one of software component deployed on said plurality of processors;
6 each said processor executing said software components;
7 each said software component controlling a programmable device via an adaptation layer;
8 said adaptation layer comprising an adaptation layer interface, at least one device object, at
9 least one capability object deployed on said device object, said device object having a
10 physical device interface object; and
11 said capability object and said physical device interface being independently replaceable.

1 27. The system according to claim 26 wherein at least one said processor is a processor
2 chosen from the group of processors comprising programmable devices, general purpose
3 processors, specialized circuits, and field programmable gate arrays.

1 28. The system according to claim 26 wherein a plurality of said software components may
2 be deployed on each said processor.
3

1 29. A method for implementing a software component on a software based distributed
2 computing framework, said method comprising:
3 deploying a program on at least one physical device by obtaining a current status of at
4 least one said physical device and loading said program on at least one available said
5 programmable device;
6 initiating processing of said program;
7 controlling said program by discovering parameters, setting said parameters, and
8 resetting said parameters;
9 communicating data to and from said program;
10 terminating said processing of said program; and
11 resetting said physical device after the processing of said program.
12

1 30. The method according to claim 29 further comprising the step of performing at least
2 one functionality with said program.

1 31. The method according to claim 29 wherein said step of initiating the processing of said
2 program comprises:
3 gaining access to a capability; and
4 setting the state of one or more bits in a control register in a physical device.
5

1 32. The method according to claim 29 wherein said step of terminating the processing of
2 said program comprises;
3 gaining access to a capability object; and
4 setting the state of one or more bits in a control register in a physical device.

1 33. The method according to claim 29 wherein said step of resetting said programmable
2 device comprises:
3 initializing a physical device;
4 mapping memory;
5 setting initial attributes of associated objects;
6 destroying capability objects;
7 removing structures from memory; and
8 de-allocating memory and objects.

1 34. The method according to claim 29 wherein the step of controlling said program
2 comprises the sub-steps of:
3 creating a map of physical memory addresses of physical device registers to names of
4 parameters for each instance within each capability of each said device;
5 gaining access to at least one said capability;
6 obtaining a set of descriptions of said parameters available to said capability within said
7 physical device;
8 returning a set of name and value pairs available for said capability; and
9 writing said parameters.

1 35. The method according to claim 29 further comprising:
2 receiving a request to establish an engineering test point monitor;
3 gaining access to a communications object;
4 setting memory addresses for the data;
5 attaching to selected interrupt service routines, interfaces, and drivers;
6 notifying said software components of the data transmission;
7 enabling the collection of test point data within said programmable device; and
8 transferring data to a processor.

1 36. The method according to claim 29, further comprising:
2 replacing a first said physical device with a second physical device; and

3 substituting a first physical device interface object, configured to interface with said first
4 physical device, with a second physical device interface object, configured to interface
5 with said second physical device.

6
1 37. The method according to claim 29, further comprising:
2 replacing a first said program with a second said program on said physical device; and
3 substituting a first capability object whereby said first program is controlled with a second
4 capability object configured to control said second program.

5
1 38. The method according to claim 29, further comprising:
2 replacing a first said program with a second said program on said physical device; and
3 substituting a first at least one instance object whereby at least one aspect of said first
4 program is controlled with a second at least one instance object configured to control at
5 least one aspect said second program.

6
1 39. The method according to claim 29, further comprising:
2 adding at least one additional capability object to an adaptation layer having a first
3 capability object controlling at least one said program;
4 deploying a plurality of said programs on said physical device.

5
1 40. The method according to claim 29 further comprising:
2 adding at least one additional physical device; and
3 adding at least one additional physical device object to an adaptation layer, said physical
4 device object corresponding to said at least one additional physical device, said adaptation
5 layer having at least one said physical device object whereby an existing said physical
6 device is controlled.

7
1 41. The method according claim 29 further comprising:
2 replacing said program and said physical device.